LAKE Co.
United States Steel
ILD 980268296
SF/HRS

CERCLA
Site Inspection Prioritization Report

Illinois Environmental Protection Agency

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VOLUME 2

1. SITE BACKGROUND

1.1 INTRODUCTION

On September 30, 1994 the Illinois Environmental Protection Agency's CERCLA Site Assessment Program was tasked by the U.S. Environmental Protection Agency (USEPA) to conduct a Site Inspection Prioritization (SIP) of the United States Steel (Waukegan Works) Site.

This investigation was undertaken by the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 40 CFR, 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986.

The United States Steel Site located in Waukegan, Illinois was initially placed on the Comprehensive Environmental Response Compensation and Liability Inventory System (CERCLIS) in response to the State of Illinois concerns that past site activities may have caused soil and sediment contamination of the surrounding community and Lake Michigan.

In April of 1995 the Illinois EPA's CERCLA Site Assessment Unit prepared a Site Inspection Prioritization Work Plan for US Steel which was submitted to the Region V Offices of USEPA for review. A site safety plan was also prepared at this time and after being reviewed by the Illinois EPA's Office of Chemical Safety, the field activity portion of the inspection occurred on May 3, 1995. The CERCLA Inspection included the collection of 15 soil and three sediment samples.

1.2 SITE DESCRIPTION

The Site was located at the intersection of 10th Street and Sheridan Road in Waukegan, Illinois. To the east it borders Lake Michigan and Abbott Laboratories to the southwest, to the north, west, and south, exist mixed residential and industrial areas. Industrial areas that include the Great Lakes Naval Training Center, the former Diamond Scrap Yard, and the Waukegan Harbor area. Further to the west of the site the primary land becomes mostly residential.

Currently the site is flat, has scattered vegetation, no buildings or structures, large areas covered by concrete, and is surrounded by a maintained fence. The original United States Steel operation occupied approximately ten acres which included an on-site landfill.

1.3 SITE HISTORY

The facility originated under the name of "American Steel Wire Company" circa 1895 and closed in 1979. Historic fire insurance maps (Sanborn Maps) for this location are blank due to the companies refusal to grant the Sanborn Company access to the facility. Water was used by United States Steel for, cooling, rinsing, cleaning, and unknown processes after its use the waste water was then discharged back into the lake. At one time the facility had nine separate discharges into Lake Michigan. Illinois EPA records show that in 1975, United States Steel applied and

received permits for these discharges. The NPEDS permit also mentions a stainless steel department and specified that the discharges be analyzed for the following parameters: suspended solids, oils and grease, total iron, total copper, total zinc, total lead, and cyanide. During this same time period United States Steel also entered into a Consent Agreement with the Illinois Attorney General and agreed to stop discharging industrial waste water in to Lake Michigan.

In early 1980, Abbott Laboratories purchase the entire 10 acre property and removed all of the structures and materials from the site. The concrete footings and floors are all that currently remains of the original site structures.

1.4 REGULATORY STATUS

Regulatory involvement at this site is limited to the above mentioned activities by the Illinois EPA and the Attorney General's Office. United States Steel was never regulated under the Resource Conservation Recovery Act, (RCRA), but Abbott Laboratories is presently fulfilling the RCRA closure requirements mandated by the Illinois EPA for the five acre on-site landfill.

This site was not part of any regular inspections by either the Illinois EPA or USEPA. Given the nature of the operation, the years it produced steel products, and the federal and state environmental regulations which existed during this time, the site in all

likelihood would not fall under the jurisdiction of the Atomic Energy Act (AEA), Toxic Substances Control Act (TSCA), Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), or the Uranium Mill Tailings Radiation Control Act (UMTRCA).

2 SIP ACTIVITIES

This section contains information gathered during the preparation of the formal CERCLA Inspection and previous IEPA activities involving this site. These activities included the reviewing of Illinois EPA records, preparation of the work plan and interviews with representatives from Abbott Laboratories.

2.1 RECONNAISSANCE ACTIVITIES

In April of 1995, Mr. Mark Wagner met with representatives from Abbott Laboratories and visited the non-landfilled portion of the original site. The site was accessed from the south through Abbott Laboratories North Chicago facility. The entire area is fenced with a north access gate that appears to be open during the day. During this reconnaissance visit it was observed that the site had no buildings or structures on it and the area did not have any visible remnants from the steel operation. It was also revealed that all the discharges are inactive except for the discharge that is in-line with 10th Street. This discharge is utilized by the city of Waukegan for storm water only.

On May 3, 1995 a pre-sampling reconnaissance inspection was conducted to identify the sampling locations and note any changes

in the site conditions or surroundings. In this case there were no notable differences from the initial April 1995, reconnaissance visit.

2.2 INTERVIEWS

As mentioned earlier Abbott Laboratories Environmental Department met with the author in April of 1995. At this time CERCLA program objectives were discussed. Abbott presented the RECRA closure plan for the United States Steel property which only address the landfill portion of the property. A 1988, Environmental Priorities Initiative (EPI) was also evaluated and found not to be applicable to this site. During this meeting Abbott express a desire to split the on-site and not the off-site sample.

A reconnaissance of the former United States Steel property was accompanied by Abbott's Environmental Director. At this time a general overview of Abbott's operation at this facility was discussed. Currently the property in question is not used by Abbott in any manner.

In May of 1995, an environmental technician accompanied the sampling team. All on-site samples were split by Abbott Laboratories and at that time the technician was unsure if their samples would be analyzed.

2.3 SAMPLING ACTIVITIES

The CERCLA Site Inspection Prioritization field sampling activities took place on May 3, 1995. 15 soil and three sediment samples were collected using stainless steel trowels and augers. All sampling was performed in accordance with IEPA sampling methods and procedures. The soil/sediment samples were taken to determine if contaminants were present at the facility and if they had migrated from the property. Figure 3, identifies the sample locations from the May 1995 SIP. Sample descriptions are summarized in Table 1.

2.4 SAMPLING RESULTS

Several semivolatile organic and inorganic substances were detected at numerous soil/sediment sample locations during the SIP. On-site soil sample points reported significantly elevated levels of semivolatile compounds including pyrene, and inorganic compounds, specifically Lead and Copper. Sediment samples also revealed high Lead, Copper, and Zinc levels in Lake Michigan. One sediment sample collected had Lead levels 50 times higher than the Sever Effect Level established in the Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario. Off-site residential soil samples had significant levels of Lead and pyrene as well. Key samples with levels and contaminants are presented in Table 2.

The complete analytical data package for United States Steel is located in Appendix E and contains a copy of the Target Compound List (TCL) and data qualifiers used by USEPA.

3 SITE SOURCES

3.1 SOURCE DEFINITION

Two sources can be identified at United States Steel, they are contaminated soil and contaminated sediment. Stack emissions from the facility are believed to have resulted in the airborne deposition of contaminates in the area around the original site. The sediment of the "near shore" along the site and the lake have been impacted by the multiple discharges from United States Steel. The samples collected during the SIP confirm these contaminated areas. Contaminates associated with the site are primarily Lead, Zinc, Copper and poly-aromatic hydrocarbons "PAHs". File information also indicates that wire scale and sludge from the on-site waste water treatment facility were deposited in the on-site landfill.

4 MIGRATION PATHWAYS

4.1 SURFACE WATER PATHWAY

The surface pathway starts where surface water run-off from the site enters the first perennial water body. This location is referred to as the probable point of entry (PPE). The PPE for United States Steel is located at any point where runoff or a discharge from the site enters Lake Michigan.

Lake Michigan is one of the Great Lakes and is a fishery. The 15 mile Target Distance Limit for this water body is a 15 mile radius arc extending easterly into the lake. As mentioned earlier one

sediment sample location had Lead levels significantly higher than the Ontario Sediment Guidelines for Severe Effects.

The lake is also a major source of drinking water for Waukegan, North Chicago and Northeastern Illinois. The intakes for both Waukegan and North Chicago are approximately one mile off shore and one aqueduct is located approximately 5000 feet from a point of document contamination.

4.2 SOIL EXPOSURE PATHWAY

The facility is not easily accessible to the local community and lacks any real recreational qualities. The soils on-site are urban soils with some "made land" along the lake. The surface of the site has: building debris, lose gravels and sands, cinders, and is sparsely vegetated. Site access is controlled by Abbott who has a well maintained fence around the perimeter of the property. There are no schools or daycare facilities within 200 feet of the site.

Two source and 11 residential samples were collected during the SIP. These off-site soil samples were generally silty-loams with some clay and sand. Sample analysis of them defined two distinct residential areas with Level II Concentrations. These areas encompass a large population and Two schools. Removal Action Levels (RALs) for Lead are approached and exceeded at two locations. These areas are highlighted in Figure 4.

4.3 GROUNDWATER PATHWAY

The site is situated on a broad, flat, ten acre area, several feet above the water level of Lake Michigan. The general geology for this area consists of glacial deposits ranging from approximately 90 feet on the east side of Lake County to 300 feet on the west side. Beach deposits are present as glacial drift, under the site and along the shoreline of Lake Michigan. Underlying this glacial drift is a layer of bedrock consisting mainly of beds of dolomite and shale which dips easterly at about 15 feet per mile. The glacial drift and dolomite formations are hydraulically connected and are underlain by a confining layer of shale. This upper drift and dolomite formations are the aquifers of concern at this site.

The general water usages with four miles of the site rely heavily on surface water from Lake Michigan. Several shallow wells are located within three miles of the site. Based on previous on-site monitoring well results and the fact that potential releases to ground water would most likely be associated with the landfill portion of the site, no groundwater samples were collected during this SIP. As mentioned earlier the lanfill portion of the site is being remediated through a RECRA closure plan.

Several industrial and standby drinking water wells are also located within three miles of the site, but they are greater that 1000 feet deep and are protected by a confining layer of Maquoketa Shale.

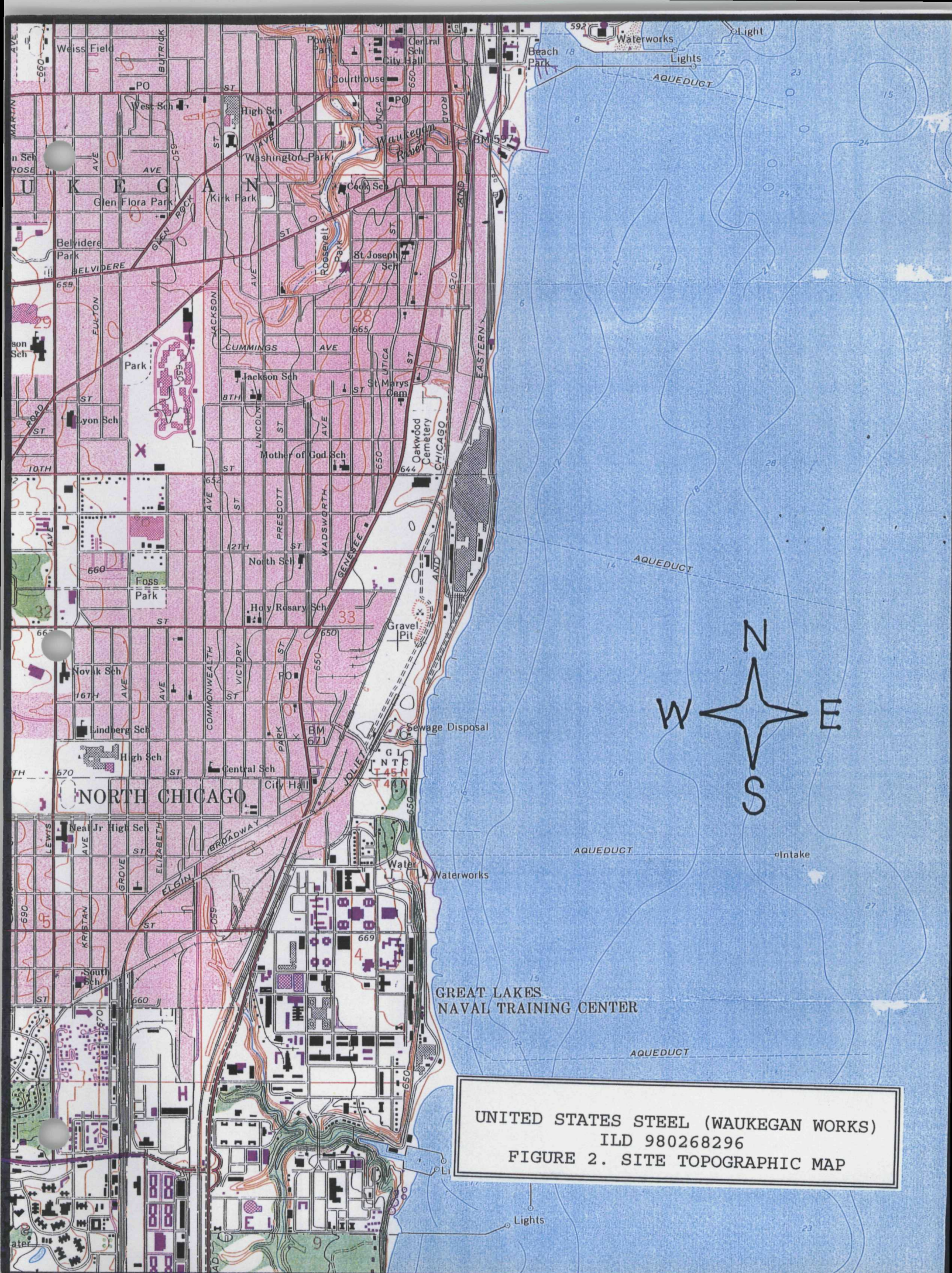
4.4 AIR PATHWAY

The closest resident is approximately 1200 feet from the site. There are no air related complaints on file with the Illinois EPA, but the review of air photos show varying levels of air emissions from this facility. No formal air samples were collected primarily due to the site being inactive.

Wind erosion of the surface soils is also minimal except during high winds due to the particle size and soil types of the contaminated soils.

SITE LOCATION MAP

FIGURE 1. N



UNITED STATES STEEL (WAUKEGAN WORKS)
ILD 980268296
FIGURE 2. SITE TOPOGRAPHIC MAP

US STEEL (WAUKEGAN WORKS)

ILD 980268296

FIGURE 3. SAMPLE LOCATIONS

1983 AIR PHOTO

N ↑

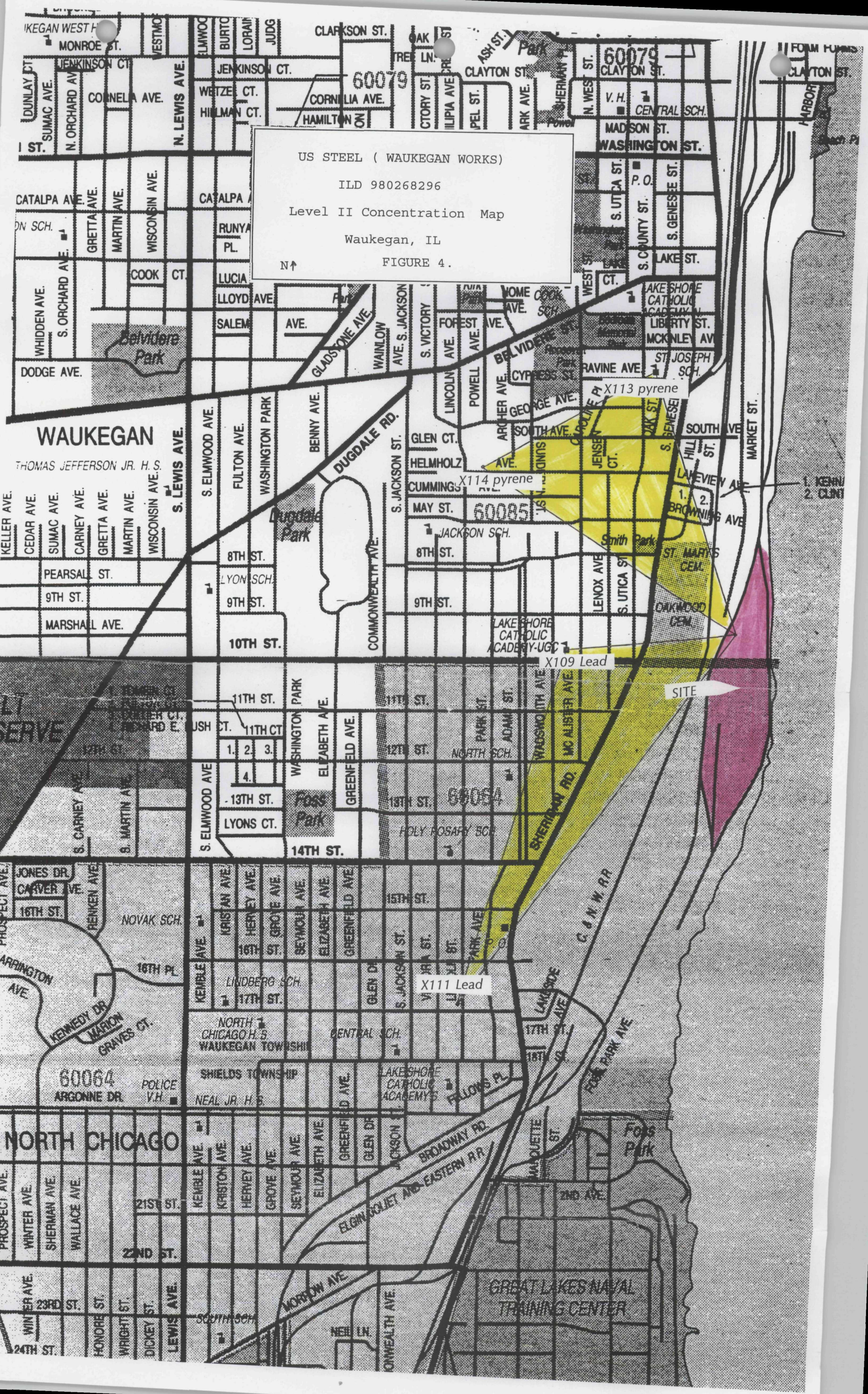
US STEEL (WAUKEGAN WORKS)

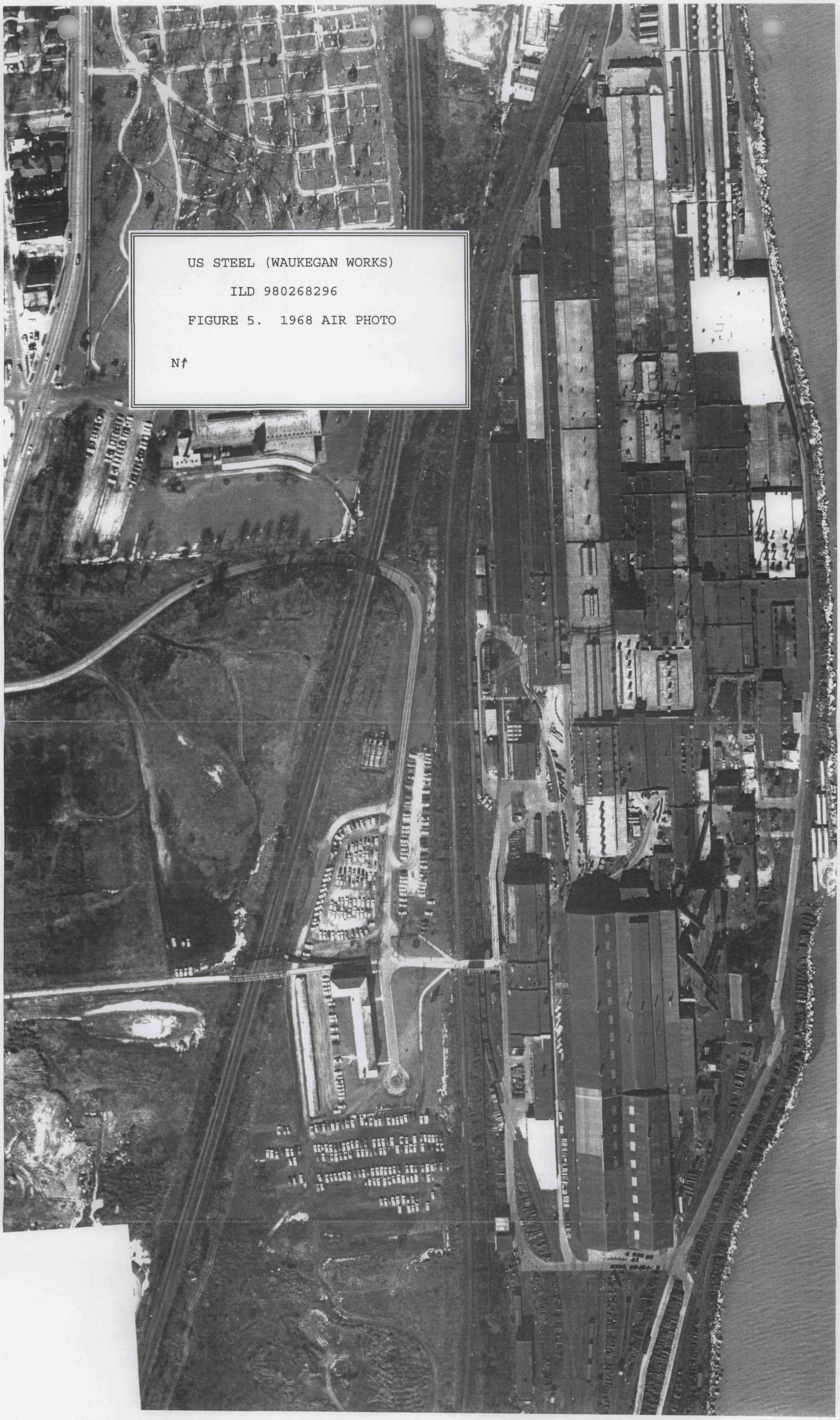
ILD 980268296

Level II Concentration Map

Waukegan, IL

N↑ FIGURE 4.





US STEEL (WAUKEGAN WORKS)

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FIGURE 5. 1968 AIR PHOTO

N↑

SAMPLE DESCRIPTIONS TABLE 1

SAMPLE #	DEPTH	APPERANCE	LOCATION
X101	0–10 inches	silty loam	Belvidere Park
			Waukegan, IL
X102	0–10 inches	dark, cinder like	44' east of the EJ&E Railroad
			16' northwest of the 3 yellow poled fire hydrant
X103	0–8 inches	cinders and sand	48' west of the access road
			near the 6" discharge pipe
X104	0–6 inches	silty loam	NON-RESPONSIVE-Residential Addresses
X105	0–6 inches	silty clay	
X106	0–6 inches	silty loam	
		with some sand	
X107	0–6 inches	clay loam	
X108	0–6 inches	sandy loam	
X109	0–6 inches	clay loam	
X110	0–6 inches	sandy loam	
X111	0–6 inches	sandy loam	
X112	0–6 inches	sandy loam	
		more sand	
X113	0–6 inches	silty loam	
X114	0–6 inches	silty loam	
		with clay mottling	
X115		duplicate of X101	
X 201		small gravel, pebbly sand	180' north of site
		more sand	on Lake Michigan
X202		small gravel, pebbly sand	northern portion of site
		more sand	50' south of a 6" discharge pipe
X203		small gravel, pebbly sand	southern portion of site
			89' south of a large discharge chute

TABLE 2. KEY SAMPLE SUMMARY

SITE NAME UNITED STATES STEEL
(Waukegan Works)

ILD 980268296

PARAMETER																	
SEMIVOLATILES ug/kg	X101	X102	X03	X014	X105	X106	X107	X108	X109	X110	X111	X112	X113	X114	X115	X201	X202	X203
Phenanthrene	250J	550	560	180J	140J	120J	200J	97J	910	1300	320	200J	2400	2100	250J	75J	22J	21U
Pyrene	730	2700	350J	230J	170J	390J	810	150J	2500	1300	780	630	5500E	5700E	870	48J	380U	23J
INORGANICS mg/kg	X101	X102	X103	X104	X105	X106	X107	X108	X109	X110	X111	X112	X113	X114	X115	X201	X202	X203
Arsenic	9.8	37.1	25.1	10.9	8.7	11.2	10.1	7.8	8.0	10.8	11.6	12.7	12.8	8.0	9.6	5.7	5.5	8.3
Barium	109	143	152	130	89.3	95.1	91.2	55.8	145	95.9	117	144	122	94.1	141	8.9B	6.6B	25.3
Cadmium	0.28U	0.22	2.1	0.40	0.77	0.71	1.2	0.26	0.96	1.4	1.9	1.5	0.28U	0.25U	0.28U	0.23U	0.23U	0.23U
Chromium	18.9	725	14.6	31.6	57.8	45.7	20.5	13.0	15.4	139	19.4	19.7	21.0	19.0	19.1	5.1	4.4	13.3
Cobalt	11.0B	5.5B	17.7	13.4B	11.6	8.9B	12.4	8.2B	7.2B	8.7B	11.3	9.7B	11.3B	10.5B	12.5B	4.0B	2.9B	4.8B
Copper	32.0	72.6	97.9	37.0	40.2	34.0	37.5	25.5	58.0	45.0	132	57.0	63.6	29.4	32.7	49.8	18.9	196
Iron	22600	84200	68200	21800	20100	17200	19900	15700	13100	18400	21300	22800	25500	21200	23800	14600	8420	46200
Lead	136	411	132	186	116	149	296	77.9	472	201	614	262	244	116	145	13.5	114	12600
Magnesium	3840	27100	1800	4250	11700	3160	10600	7150	27700	6830	9550	10100	9510	9320	3760	32700	49400	31100
Manganese	862	20800	356	887	803	487	745	526	583	540	726	805	772	774	1160	757	799	978
Mercury	0.14U	0.20	0.25	0.18	2.4	0.22	0.12U	0.13U	0.14	0.13U	0.18	0.64	0.14U	0.13U	0.14U	0.12U	0.12U	0.12U
Nickel	22.2	25.9	47.5	24.0	25.0	18.5	24.2	16.1	14.7	21.4	23.2	24.3	30.5	20.7	24.2	10.5	6.2B	16.8
Selenium	2.7	7.6	4.5	2.0	1.9	3.3	1.9	2.6	1.9	2.0	2.9	2.4	2.2	2.8	3.0	1.3	1.1B	2.5
Thallium	1.5B	1.1U	1.5B	1.3U	1.4	1.3U	1.2U	1.5B	1.2B	1.3U	1.9B	1.3U	1.4U	1.3B	1.4U	1.4B	1.2U	2.2B
Vanadium	28.3	229	31.1	28.7	24.3	22.4	25.3	19.2	15.9	23.4	27.4	24.5	29.5	25.6	28.4	11.6B	7.2B	11.0B
Zinc	131	272	452	226	184	175	410	124	411	318	862	392	330	205	151	169	132	1240
Cyanide	0.77	0.54U	0.61U	0.67U	0.61U	0.66	0.60	0.66	0.57U	1.9	0.66U	1.1	0.69U	0.63U	0.71U	0.58U	0.58U	0.58U

APPENDIX A
4 MILE RADIUS & 15 MILE SURFACE WATER MAP

SDMS US EPA Region V

Imagery Insert Form

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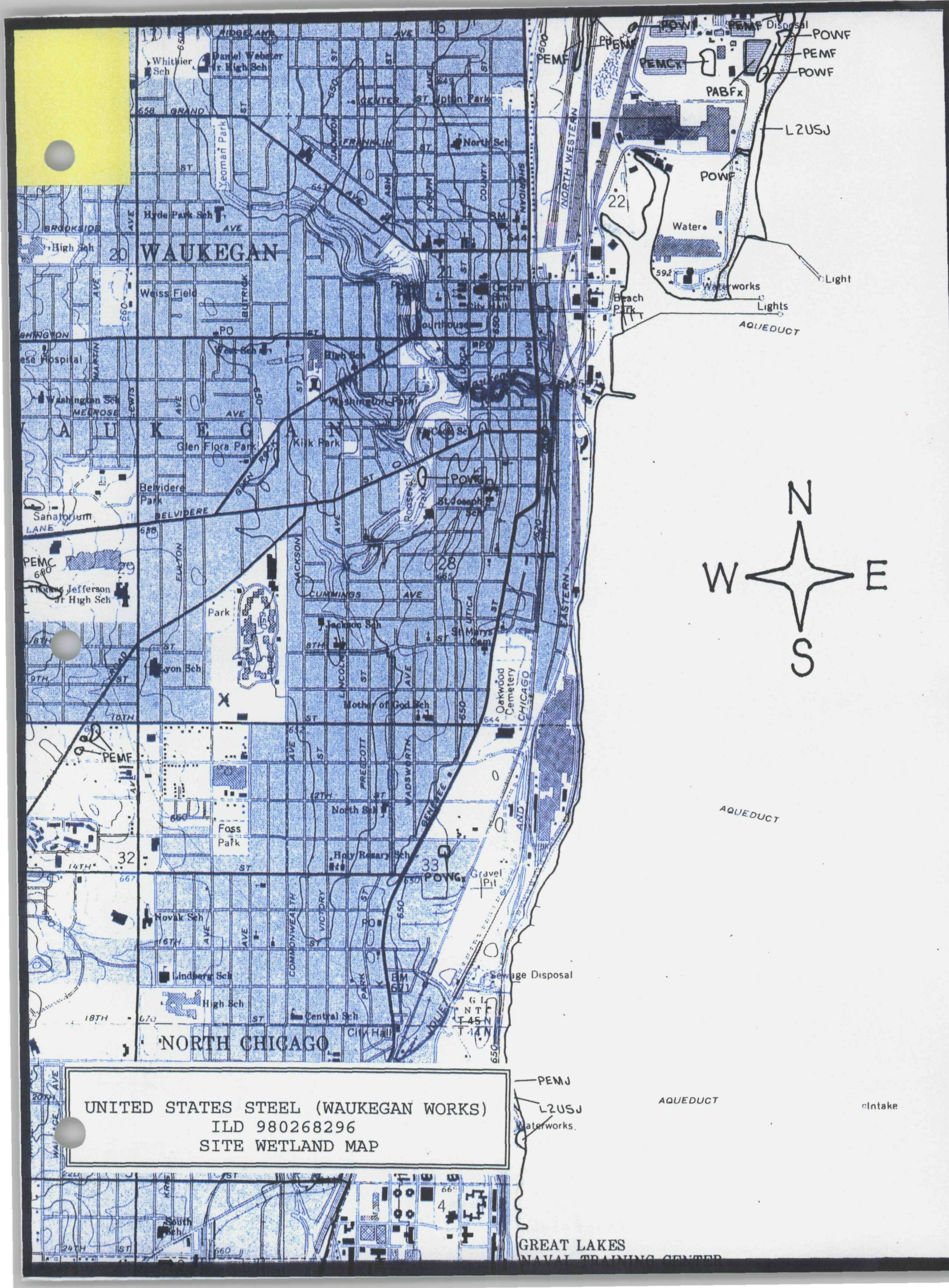
4- MILE RADIUS MAP & 15-MILE SURFACE WATER ROUTE MAP

☐ **Other:**

APPENDIX B
AREA WETLAND MAP



UNITED STATES STEEL (WAUKEGAN WORKS)
ILD 980268296
SITE WETLAND MAP

APPENDIX C
TARGET COMPOUND LIST & DATA QUALIFIERS

TARGET COMPOUND LIST

Volatile Target Compounds

Chloromethane	1,2-Dichloropropane
Bromomethane	cis-1,3-Dichloropropene
Vinyl Chloride	Trichloroethene
Chloroethane	Dibromochloromethane
Methylene Chloride	1,1,2-Trichloroethane
Acetone	Benzene
Carbon Disulfide	trans-1,3-Dichloropropene
1,1-Dichloroethene	Bromoform
1,1-Dichloroethane	4-Methyl-2-pentanone
1,2-Dichloroethene (total)	2-Hexanone
Chloroform	Tetrachloroethene
1,2-Dichloroethane	1,1,2,2-Tetrachloroethane
2-Butanone	Toluene
1,1,1-Trichloroethane	Chlorobenzene
Carbon Tetrachloride	Ethylbenzene
Vinyl Acetate	Styrene
Bromodichloromethane	Xylenes (total)

Base/Neutral Target Compounds

Hexachloroethane	2,4-Dinitrotoluene
bis(2-Chloroethyl)Ether	Diethylphthalate
Benzyl Alcohol	N-Nitrosodiphenylamine
bis(2-Chloroisopropyl)Ether	Hexachlorobenzene
N-Nitroso-Di-n-Propylamine	Phenanthrene
Nitrobenzene	4-Bromophenyl-phenylether
Hexachlorobutadiene	Anthracene
2-Methylnaphthalene	Di-n-Butylphthalate
1,2,4-Trichlorobenzene	Fluoranthene
Isophorone	Pyrene
Naphthalene	Butylbenzylphthalate
4-Chloroaniline	bis(2-Ethylhexyl)Phthalate
bis(2-chloroethoxy)Methane	Chrysene
Hexachlorocyclopentadiene	Benzo(a)Anthracene
2-Chloronaphthalene	3,3'-Dichlorobenzidene
2-Nitroaniline	Di-n-Octyl Phthalate
Acenaphthylene	Benzo(b)Fluoranthene
3-Nitroaniline	Benzo(k)Fluoranthene
Acenaphthene	Benzo(a)Pyrene
Dibenzofuran	Indeno(1,2,3-cd)Pyrene
Dimethyl Phthalate	Dibenz(a,h)Anthracene
2,6-Dinitrotoluene	Benzo(g,h,i)Perylene
Fluorene	1,2-Dichlorobenzene
4-Nitroaniline	1,3-Dichlorobenzene
4-Chlorophenyl-phenylether	1,4-Dichlorobenzene

Acid Target Compounds

Benzoic Acid	2,4,6-Trichlorophenol
Phenol	2,4,5-Trichlorophenol
2-Chlorophenol	4-Chloro-3-methylphenol
2-Nitrophenol	2,4-Dinitrophenol
2-Methylphenol	2-Methyl-4,6-dinitrophenol
2,4-Dimethylphenol	Pentachlorophenol
4-Methylphenol	4-Nitrophenol
2,4-Dichlorophenol	

Pesticide/PCB Target Compounds

alpha-BHC	Endrin Ketone
beta-BHC	Endosulfan Sulfate
delta-BHC	Methoxychlor
gamma-BHC (Lindane)	alpha-Chlorodane
Heptachlor	gamma-Chlorodane
Aldrin	Toxaphene
Heptachlor epoxide	Aroclor-1016
Endosulfan I	Aroclor-1221
4,4'-DDE	Aroclor-1232
Dieldrin	Aroclor-1242
Endrin	Aroclor-1248
4,4'-DDD	Aroclor-1254
Endosulfan II	Aroclor-1260
4,4'-DDT	

Inorganic Target Compounds

Aluminum	Manganese
Antimony	Mercury
Arsenic	Nickel
Barium	Potassium
Beryllium	Selenium
Cadmium	Silver
Calcium	Sodium
Chromium	Thallium
Cobalt	Vanadium
Copper	Zinc
Iron	Cyanide
Lead	Sulfide
Magnesium	Sulfate

SPECIAL PESTICIDE LIST

2,4-D

Atrazine

Metolachlor -- Dual

Cyanazine -- Bladex

Fonofos -- Dyfonate

EPTC -- Eptam, Eradicane

Phorate

Metribuzin -- Lexone, Sencor

Trifluralin -- Treflan

Diazinon

Alachlor -- Lasso

U.S.E.P.A. DEFINED DATA QUALIFIERS

QUALIFIER	DEFINITION ORGANICS	DEFINITION INORGANICS
• U	Compound was tested for but not detected. The sample quantitation limit must be corrected for dilution and for percent moisture. For soil samples subjected to GPC clean-up procedures, the CRQL is also multiplied by two, to account for the fact that only half of the extract is recovered.	Analyte was analyzed for but not detected.
• J	Estimated value. Used when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed or when the mass spectral data indicate the presence of a compound that meets the identification criteria and the result is less than the sample quantitation limit but greater than zero. Used in data validation when the quality control data indicate that a value may not be accurate.	Estimated value. Used in data validation when the quality control data indicate that a value may not be accurate.
• C	This flag applies to pesticide results where the identification is confirmed by GC/MS.	Method qualifier indicates analysis by the Manual Spectrophotometric method.
• B	Analyte was found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action	The reported value is less than the CRDL but greater than the instrument detection limit (IDL).
• D	Identifies all compounds identified in an analysis at a secondary dilution factor. If a sample or extract is re-analyzed at a higher dilution factor as in the "E" flag above, the "DL" suffix is appended to the sample number on the Form I for the diluted sample, and all concentration values are flagged with the "D" flag.	not used

QUALIFIER	DEFINITION ORGANICS	DEFINITION INORGANICS
• E	Identifies compounds whose concentrations exceed the calibration range for that specific analysis. All extracts containing compounds exceeding the calibration range must be diluted and analyzed again. If the dilution of the extract causes any compounds identified in the first analysis to be below the calibration range in the second analysis, then the results of both analyses must be reported on separate Forms I. The Form I for the diluted sample must have the "DL" suffix appended to the sample number.	The reported value is estimated because of the presence of interference
• A	This flag indicates that a TIC is a suspected aldol concentration product formed by the reaction of the solvents used to process the sample in the laboratory.	Method qualifier indicates analysis by Flame Atomic Absorption (AA).
• M	not used	Duplicate injection (a QC parameter) not met.
• N	not used	Spiked sample (a QC parameter) recovery not within control limits.
• S	not used	The reported value was determined by the Method of Standard Additions (MSA).
• W	not used	Post digestion spike for Furnace AA analysis (a QC parameter) is out of control limits of 85% to 115% recovery, while sample absorbance is less than 50% of spike absorbance.
• *	not used	Duplicate analysis (a QC parameter) not within control limits.
• +	not used	Correlation coefficient for MSA (a QC parameter) is less than 0.995.

QUALIFIER	DEFINITION ORGANICS	DEFINITION INORGANICS
P	not used	Method qualifier indicates analysis by ICP (Inductively Coupled Plasma) Spectroscopy.
• CV	not used	Method qualifier indicates analysis by Cold Vapor AA.
• AV	not used	Method qualifier indicates analysis by Automated Cold Vapor AA
• AS	not used	Method qualifier indicates analysis by Semi-Automated Cold Spectrophotometry.
• T	not used	Method qualifier indicates Titrimetric analysis.
• NR	The analyte was not required to be analyzed.	The analyte was not required to be analyzed.
• R	Rejected data. The QC parameters indicate that the data is not usable for any purpose.	Rejected data. The QC parameters indicate that the data is not usable for any purpose.